

PROCEEDINGS OF THE SECOND ANNUAL SYMPOSIUM FOR NONDESTRUCTIVE EVALUATION OF BOND STRENGTH pdf

1: Publications | Laboratory for Infrastructure Science and Sustainability (LISS)

Fifteen nondestructive evaluation (NDE) experts met for the Second Annual Review of NASA's NDE of Bond Strength Program at LaRC, NDE Sciences Branch on November 6,

Anderson in memoriam of Robert L. Patrick Deceased , Vol. Mittal, Marcell Dekker Publ. The Netherlands
Van Ooij and H. Anderson, , VSP Publ. Zeist, Netherlands, Mittal, Marcel Dekker, Inc. Determination of
Elastic and Mechanical Properties, Ed. Testing Analysis and Design, Ed. Overberger, John Wiley and Sons,
2nd Ed. Koblitz, Plenum Press, Lindholm, Gordon and Beach Publishers, Ltd. Peterlin, Marcel Dekker, Inc.
Publications Book Chapter Conferences Top Kinloch," a book review, International Journal of Fracture,
Johnson, , November L and Franconi, B. M and DeVries, K. Dole Commentary," Polymer Communications,
Organic Coatings and Plastics Chemistry, May, , , Society for Experimental Mechanics, Inc. Also delivered
an address at Valedictory Function. Hornberger, Lee, Rusmee, P. National Congress of Applied Mechanics,
Abstract, p. Abstract published in proceedings, p. Paper in this proceedings accompanied invited presentation
in the Symposium on Environmental Degradation and Stabilization of Polymers. Symposium held in
Baltimore, MD, September , This is an abstract of a paper presented at this conference. This is a paper that
accompanied my invited presentation at the conference in Jamshedpur India. Box , Louisville, KY, Louis,
MO, June American Physical Society,

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2: U of M - Compliant Systems Design Laboratory

Second Annual Symposium for Nondestructive Evaluation of Bond Strength: Responsibility: compiled by Mark J. Roberts ; proceedings of a symposium sponsored by the National Aeronautics and Space Administration, Washington, D.C., and held at Langley Research Center, Hampton, Virginia, November 6,

Environmental Protection Agency Gail A. A fundamental component of all programs relating to waste management is the need to perform measurements. These measurements include waste composition and properties; effectiveness of management processes; engineering properties of materials used in constructing management units; and, last but not least, long term performance of such management units. Thus the pivotal roles played by the measurement methodology and, its attendant, quality assurance. The analysis of complex waste matrices presents the environmental community with demanding analytical problems for which solutions are being developed at a rapid rate. Our purpose in holding these symposia is several fold. Third, as a forum for discussion between Agency personnel and representatives from public and private laboratories involved in waste sampling and evaluation. The presentations describe work in progress. Current plans are that ASTM will publish the complete proceedings in the near future and that prior to publication, the material presented during the symposium will be updated. Truesdale, Research Triangle Institute, P. Braidst, Geraghty and Miller, Inc. Gardner, Lockheed Corporation, E. Wylie Northrop Services, Inc. Environmental Protection Agency Washington, D. Two test devices were chosen because each device has its advantages and disadvantages and best area of application. Evaluation of both test methods involved a collaborative testing program with sixteen laboratories, one chemical, and one soil. It has been recognized for many years that the permeability of clay soils may be altered by the presence of certain chemicals in the permeating fluid. Currently, there are several tests for determining the hydraulic conductivity of inorganic materials used to line waste facilities e. Most of these tests also have been used to measure the chemical compatibility of liner materials. Selection of the test method and procedure can have a profound effect on the test results. In addition, specific test methods may be suitable for determining hydraulic conductivity but unsuitable for compatibility tests. The objective of this research effort was to develop and evaluate procedures for measuring hydraulic conductivity and chemical compatibility. To accomplish this objective, the following approach was used: This paper summarizes the results of this research effort, except for results of the collaborative testing program which were not available at the time of its preparation. BACKGROUND The procedure most commonly used for measuring the hydraulic conductivity of a compacted soil is to enclose the sample tightly in a cylinder permeameter , saturate the sample, and then pass a liquid permeant through the sample. The pressure differential across the sample is expressed in terms of hydraulic gradient a dimensionless quantity , which is the change in pressure head across the sample divided by the height of the sample. The gradient can be controlled by superimposing air pressure above the permeant supplied to the influent end of the sample and by regulating the backpressure applied at the effluent end of the sample. A change or lack of change in the volume of K when compared to K for water may be due to a combination of two factors: To separate these effects, it is necessary to report the results of compatibility tests in terms of intrinsic permeability k , which is a property of the porous medium alone, both for the tests with the baseline permeant fluid and for the tests with the chemical permeant fluid in question. Intrinsic permeability has units of length squared e. Provided that the density and viscosity of the test fluid at the test temperature are known, one can calculate the k value to correspond to each K value reported. Permeameter Types Three types of permeameters have been used to measure hydraulic conductivity of fine-grained soils. The fixed-wall permeameter Figure 1 consists of a rigid cylinder of plastic or metal, often 4 inches in diameter, which has been modified to contain a soil sample and to allow a permeant to flow through it. A soil sample is usually compacted directly in the cylinder. In a flexible-wall permeameter, Figure 2 a cylindrical column of soil is encased laterally in a flexible membrane often latex rubber and enclosed at the ends with porous stones. The enclosed soil sample is placed in a fluid-

filled cell that is pressurized to provide a confining pressure on the sides of the sample. The confining fluid and the permeant are contained in two entirely separate systems which do not allow the two fluids to mix. The sample to be tested may be prepared in a compaction mold and extruded for testing in the flexible-wall cell or may be samples taken from the field using a Shelby tube or other coring device. Consolidation cells are commonly used in the field of geotechnical engineering to determine the compressibility and rate of settlement of soils. Consolidation occurs when water is squeezed out of the soil and is therefore a function of permeability. Flexible-Wall Permeameter bility and is commonly used for applications such as earth dams, retaining walls, and slurry trenches. This device has not been used widely in the evaluation of the chemical compatibility of clay liner materials or for the measurement of hydraulic conductivity. For this reason, test procedures using this device were not evaluated. While there were differences in conductivities measured with the three devices, the type of permeameter did not seem to have a large effect on the results. Differences in measured permeabilities between devices were substantially less than one order of magnitude. Factors Influencing Testing Results Important factors that influence permeability measurements include sample characteristics and preparation, permeant properties, design of the test apparatus, and selection and control of variables during performance of the test. Some of the more important factors are discussed below. Drying facilitates breaking up clods, sieving the soil, and obtaining a homogeneous soil mass for testing. With some soils, however, rehydrated dried soil has different properties than soil maintained at field moisture. In spite of rehydration times of several weeks a 24 hour curing period is commonly used for laboratory tests, the properties of some clays were irreversibly altered by drying. However, Daniel and Liljestrant tested the permeability of a Gulf Coast clay prepared with and without air drying. This clay did not show any appreciable difference in permeability as a result of the different sample preparation regimes. This suggests that although the properties of some clays may be irreversibly changed by drying, some clays are not appreciably affected. Daniel demonstrated that clod size can significantly affect laboratory permeability measurements. This illustrates the importance of controlling clod size to obtaining consistent laboratory permeability measurements. Compaction Methods-- Several techniques have been developed for preparing laboratory compacted clay samples for permeability testing. For flexible wall tests, the clay is compacted in a separate compaction mold, extruded and then trimmed to fit the permeameter. When samples are trimmed to length, care must be exercised to avoid forming smear zones from the cutting tool sliding against the clay. These smear zones can decrease the permeability of the sample by as much as 20 percent. Carpenter, There are three methods that are commonly used to compact test samples in the laboratory. Recently Dunn and Mitchell reported that when otherwise identical samples were compacted by different methods to 90 and 95 percent of their maximum dry density, there were notable differences in their hydraulic conductivities. At both dry densities, static compaction produced samples with the highest hydraulic conductivities, impact was second highest, and kneading the lowest. The measured hydraulic conductivities showed an increase with sample diameter; the smallest diameter having the lowest conductivity. All the samples were tested at a gradient of 2. Anderson and Bouma experimented with a series of undisturbed core samples of different lengths to determine the effect of sample size on permeability. The pores are filled with either gas usually air or liquid. Because water cannot flow through a gas bubble, entrapped air within the interconnected pores blocks flow channels causing a reduction in permeant flow and a correspondingly low apparent permeability. Soaking the sample from the bottom with the top open to the atmosphere a technique used by some in an attempt to saturate the samples may not result in complete saturation. Smith and Browning found that in specimens soaked from the bottom, the degree of saturation averaged 91 percent with the lowest value at 78 percent. The extent of the error in permeability measurement attributable to entrapped gas bubbles has been studied by several investigators. Decreases in permeability by factors ranging from 2 to 5 have been reported by Johnson. Olsen and Daniel presented evidence that the coefficient of permeability may increase by about four orders of magnitude as the degree of saturation increases from around 20 to percent. The application of backpressure to a soil sample is the most effective

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method for achieving saturation Matyas, ; Daniel et al. Backpressure is pressure applied to the pore fluid within a sample for the purpose of compressing entrapped air bubbles and causing the gas to go into solution in the permeant. This is accomplished by simultaneously applying pressure to both the inflow and outflow ends of the soil sample. The two implied conditions in the Darcy equation are: There is no single accepted hydraulic gradient for use in permeability testing. Oakes, Mitchell and Younger, and others have published data that indicate a departure from linearity at low hydraulic gradients. Bowles observes that in clays a threshold gradient of 2 to 4 may be necessary to produce any flow. However, if hydraulic gradients are excessive, piping opening flow channels and increasing hydraulic conductivity or particle migration blocking flow channels and reducing hydraulic conductivity may occur, and this can significantly influence permeability measurement. Although such effects can occur and have been reported Daniel, ; Mitchell and Younger, , studies have been conducted at elevated gradients with no evidence of piping or particle migration e. Dunn and Mitchell reported that increasing the gradient in steps from 20 to caused an irreversible decrease in hydraulic conductivity. Not all researchers are in agreement on this issue, since the effect has not been demonstrated clearly in comparative tests. However, Boynton and Daniel allowed desiccation cracks to form in soil samples which were then tested with confining pressures of 2, 4, 8, and 15 psi. They found that the permeability decreased markedly as the effective stress increased. Confining pressures in the range of 4 to 8 psi were sufficient to begin closing the cracks, and confining pressures in excess of 8 psi closed the cracks and greatly decreased permeability. Current Practices in Commercial Laboratories Peirce la, examined the permeability testing procedures of three commercial laboratories. These procedures are presented in Table 1. The information gathered is presented in Table 2. The influence on permeability of factors such as material handling, sample preparation, and sample size, makes it questionable whether permeability test results reported by different laboratories are comparable. Two test devices were selected for test procedure development and evaluation: Advantages and disadvantages of these devices are summarized in Table 3. Detailed test procedures for each of these devices were developed Truesdale et. Rationale for the selection of several key test parameters common to both test devices is presented in this section. Sample Preparation The physical properties of some clay change irreversibly upon drying. For this reason it is important to maintain as much moisture in the sample as is practicable. However, it is necessary to dry the clay to the point that clods can be reduced easily to the specified size and homogenized 4 mesh ; poor preparation will introduce variability in the test results. Ib,d-t rp with 0.

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3: NONDESTRUCTIVE EVALUATION OF WOOD AND WOOD-BASED MATERIALS - UNIVERSITY OF C

This paper reviews bond strength research efforts presented by university and industry experts at the Second Annual Symposium for Nondestructive Evaluation of Bond Strength organized by the NDE.

Furniture Frame Analysis and Design. Thesis, Purdue University, pp. Analysis and Design of Furniture Frames. Wood Science and Technology 3 3: Forest Products Journal 19 Meiho International Wood Survey in Japanese. Wood Science 2 4: How to Design Strong Dowel Joints. Furniture Design and Manufacturing 42 4: How to Design Dowel Joints. Comparison of the Strength of Wood and Plastic Beams. Forest Products Journal 20 5: Azeotropic Drying of Hardwoods under Vacuum. Forest Products Journal 20 6: Part II "Engineering Concepts. Furniture Design and Manufacturing 42 9: Forest Products Journal 20 Engineering Design of Plastic Furniture. How to design Plastic Furniture. Journal of the Society of Plastics Engineers 26 Also reprinted in the February issue of Furniture Design and Manufacturing. Forest Products Journal 21 3: Textured versus Plain Dowels " Which are Stronger? Furniture Design and Manufacturing 43 4: Designing Joints with Gusset Plates. Furniture Design and Manufacturing 43 9: Shear Strength of Dowel Joints. Furniture Design and Manufacturing 43 Meiho International Wood Survey Japanese. Furniture Design and Manufacturing 44 6: Furniture Methods and Materials. Mortise and Tenon Joints: Furniture Design and Manufacturing 45 1: Working Formulas for Screws. Furniture Production 37 , 37 , 37 , 9 pp. Torsional Considerations in the Design of Furniture. Furniture Design and Manufacturing 46 3: Meiho International Wood Survey, No. Which Screw Holds Best? Furniture Design and Manufacturing 46 9: Reasonable Design Stresses for Woods used in Furniture. Screw-Holding Performance in Hardwoods and Particleboard. Forest Products Journal 25 6: Structural Criteria for Furniture Design. Furniture Methods and Materials 23 10 , 23 12 , 7 pp. Bending Strength of Tubular Steel Joints. Forest Products Journal 28 8: National Technical Information Service. Department of Commerce, Washington, D. National Technical Information Service, department of Commerce. Withdrawal Strength of Dowel Joints: Effect of Shear Strength. Forest Products Journal 29 1: International Journal of Furniture Research 1 1,2: Forest Products Journal 29 5: Forest Products Journal 29 8: Forest Products Journal 29 Furniture Design and Manufacturing 51 8 , 3 pp. Performance Tests for Upholstered Furniture Frames. International Journal of Furniture Research 1 6,7. International Journal of Furniture Research 2 1,2: Furniture Manufacturing Management 26 9: Upholstered Furniture Test Method. Research Finds a New Furniture Feedstock. Plywood and Panel 22 4: Performance and Quality Assurance Testing. Journal of Interior Design Education and Research 7 1: Glued Joints in Wood. Encyclopedia of Materials Science and Engineering. Description of a Log Knot Generator. Holding Strength of Fasteners in Particleboard. Furniture Design and Manufacturing Vol. Introduccion al diseno de ingeniera del mueble. Instituto Tecnologico de Costa Rica. Forest Products Journal 34 6: Holding Strength of Metal Inserts in Wood. Procedures for Improving the Quality of Taiwanese Furniture. Taiwan Woodworking and Furniture Digest no. The Analysis of Five-Sided Cases. Forest Products Journal 35 3: Forest Products Journal 35 4: Withdrawal Strength of Dowels from Wood Composites. Forest Products Journal 35 5: Forest Products Journal 36 2: Forest Products Journal 36 3: Furniture Production and Design 86 5: Furniture Design and Manufacturing 59 6: Lin, Shi-Chao, and Eckelman, C. Forest Products Journal 37 1: Forest Products Journal 37 6: NotiMueble, Edition Especial, Ano 5, pp Translated into Spanish by Mr. Diseno Estructural e Ingenieria del Producto. Forest Products Journal 37 9: Markets for Hardwood Laminated Veneer Lumber. Forest Products Journal 37 Forest Products Journal 38 1 Performance Testing of Furniture. Forest Products Journal 38 3:

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4: DeVries Publications

*Proceedings of the Second Annual Symposium for Nondestructive Evaluation of Bond Strength (SuDoc NAS) [NASA] on www.enganchecubano.com *FREE* shipping on qualifying offers.*

Advance the understanding of the characteristics and use of ultrasonics for wood and wood-based materials. Undertake fundamental studies in areas where ultrasonics can provide unique advantages. Seek collaboration and sponsorship for developing technology of value to the industry. Assist in the transfer of technology to effect end-use. Develop techniques for measurement of the condition of deteriorated wood in service using acoustic emission. Use acoustic emission to determine the stress condition of wood in drying. Assess the failure patterns in wood and wood-based materials under long-term load using acoustic emission. Advanced air coupling for measuring surface roughness of solid wood. Develop experimental data to permit charring monitoring in solid wood. The first publication has been submitted on seismic testing of plywood and oriented strandboard shear walls that shows substantial performance differences. Fire test protocols are now being written into the building code for the State of California. Impacts The drying project has been supported by Department of Energy in recognition of the substantial energy savings by reducing the time to dry lumber. Our seismic work will lead to safer design of housing to withstand large earthquakes. The fire research is expected to greatly reduce the number of homes lost to wildfire throughout the US. Monitoring creep-rupture in oriented strandboard using acoustic emission: The seismic test facility has produced data on plywood and oriented strandboard shear walls that shows substantial performance differences. The final reports on fire tests on exterior building assemblies have been completed with the data reported on our web page www. Acoustic emission and acousto-ultrasonics. In *Nondestructive Testing of Wood Eds: Hardwood drying control using acoustic emission. The Key to Profitable Manufacturing. How the properties of wood affect the final product. Process and analysis of signals through dimension wood using acousto-ultrasonics. Monitoring creep rupture in oriented strandboard using acoustic emission: Process and analysis of signals through clear wood using acousto-ultrasonics. Control of lumber drying using ultrasonic methods. Acoustic monitoring of hardwood lumber drying. Nondestructive evaluation and testing of wood and wood-based materials. Managing for Fire in the Interface: Chapter 13 in Forests at the Wildland-Urban Interface: Conservation and Management S. CRC Press In press. Performance of deck board materials under simulated wildfire conditions. A test facility has been completed and used for assessing seismic performance of oriented strandboard that has been degraded through environmental exposure. A wide range of fire tests on exterior building assemblies has been completed with the data reported on our web page www. Impacts The drying project has been supported by the Department of Energy in recognition of the substantial energy savings by reducing the time to dry lumber. Nondestructive testing and evaluation of structural wood and wood-based materials. Proceedings, Topics and Nondestructive Evaluation: Mitigation of fire damage in the urban-wildland interface. Ultrasonic methods to monitor and control lumber drying. Methods for improving drying quality of wood. Santiago de Compostela, Spain. Overview--transitions, testing, and politics of performance code development. Testing protocols and fire tests in support of performance based codes. Work is continuing on ultrasonic detection of surface roughness of wood-based materials under sponsorship of a USDA competitive grant. A new graduate student is extending the sensitivity analysis on actual wood surfaces. Our portable termite detector project was completed and a vendor is now producing commercial versions, one of which is currently under testing at our facility. A patent has been issued for a novel method of kiln control, which is under license. New work has gotten underway on assessing the performance of oriented strandboard in both seismic and fire tests. Impacts The products from forests from California and elsewhere represent one of the major natural resource materials that are consumed in the state. There are major efforts underway to reduce pressures on forests and landfill through greater recycling and reuse, and by improving the durability of materials in service, which will have a major impact on our existing and future forests. Unfortunately, we have substantial gaps in our technological*

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ability to assess the properties of the materials represented in these efforts. California is the largest consumer state, accounting for a greater per-capita consumption of wood and wood-based materials than all other states. The primary use of these materials is in structures, including residential housing. Obviously, shelter is a basic human need which includes social concerns for economic well-being and security, and technical issues relating to performance of structures in fire, seismic exposure, and floods, as well as durability. Process control of particleboard curing using acousto-ultrasonics. Classification study for using acousto-ultrasonics to detect internal decay in glulam beams. Special sticker and procedure for detecting acoustic emission AE or ultrasonic transmission during drying of lumber. In *Nondestructive Testing of Wood*. Miller-Freeman In press Beall, F. Overview of the use of ultrasonic technologies in research on wood properties. New equipment has extended the range of sensitivity to three orders of magnitude. Our portable termite detector project is nearly completed with two pre-commercial prototypes undergoing final testing. The press monitor system has now received a patent and is licensed for development. Another patent is pending for a novel method of kiln control and the license has been signed for development. Ultrasonic monitoring of resin curing in a press for the production of particle board and similar materials. Subsurface sensing of properties and defects In wood and wood products. *Int J Subsurface Technologies and Applications* 1 2: A new approach of surface roughness measurement using air-coupled ultrasound. University of West Hungary, Sopron. Chen, L and F. Monitoring bond strength development in particleboard during pressing using acousto-ultrasonics. *The Encyclopedia of Materials: In Press* Beall, F. We are pursuing work on ultrasonic detection of surface roughness of wood-based materials under sponsorship of a USDA competitive grant. Preliminary results show good correlation of output with about 1. Our portable termite detector is progressing and we have completed our screening tests for sensitivity to distance. Our press monitor system has been submitted for patenting and the claims have been accepted; a licensee has been identified for commercialization. A second patent has been submitted on a novel method of kiln control and a collaborator and licensee identified. Utilization options for woody biomass. Vol X, I-Zone Series. Univ Cal For Prod Lab. Monitoring of resin curing in a laboratory press using acousto-ultrasonics. Using spatial averaging and relative measurement techniques to improve acousto-ultrasonic decay detection efficiency. Classification studies for using acousto-ultrasonic to detect decay in glulam beams. *J Wood Sci and Technol*. We have shown conclusively that ultrasonic detection is very sensitive, providing there are enough means of measuring the transmitted signal parameters. The previously completed research on the use of ultrasonic techniques to non-intrusively detect the in-situ curing of particleboard has led to a patent application and an option for licensing. Work has been completed to define origin of fractures in oriented strandboard that was stressed under constant load. This work is continuing using smaller specimens to allow greater variation in test exposure and better resolution in origin of fractures. Preliminary work was completed on the use of air-coupled ultrasound to measure the surface roughness of wood and wood-based materials. The results show very good resolution of a portion of the surface profile that is needed. Work is continuing on development of a handheld instrument for field detection of termites. The prototype has been modified several times to improve sensitivity and usability under field conditions. Two patents were granted: Method and apparatus for non-destructively detecting hidden defects caused by bio-deterioration in living trees and round wood materials. Method and apparatus for non-intrusively detecting hidden defects caused by bio-deterioration in living trees and round wood materials. The use of acousto-ultrasonics to detect biodeterioration in structural wooden members. University of VUN, R.

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5: Missouri S&T - Composite Materials

Ultrasonics, microwaves, optically stimulated electron emission (OSEE), and computational chemistry approaches have shown relevance to bond strength determination. Nonlinear ultrasonic nondestructive evaluation methods, however, have shown the most effectiveness over other methods on adhesive bond analysis.

Although my research has been very broad in nondestructive evaluation NDE of wood and wood-based materials, the main concentration is now on durability improvement and disaster mitigation of structures. The key areas are studies on the effects of aging of wood and wood-based structural elements with respect to degradation by fungi, fire, and earthquakes. California is just about an "ideal" state to study these effects and try to find ways to improve the performance of housing, virtually all of which is wood-frame construction. Much of the background for this research is now included in an upper division course in Architecture Arch Performance of wood in structures. Current Projects We have completed the development of a new testing facility for evaluating seismic performance of small-scale wood shear walls typically 2 x 4 studs with plywood or oriented strandboard panels. These walls are critical to the earthquake effects on wood-frame buildings. Our overall plan is to fully define the characteristics of the materials using NDE techniques, age the assemblies through artificial weathering exposure, see how they perform, and then determine how we can improve performance. Part of our evaluation system includes an XY table to be able to scan the materials for their properties prior to testing. This small scale wall assembly 1. Our fire work on improvement of the performance of wood-based subsystems of housing in the urban-wildland interface has progressed to the point of moving into model codes for the state of California and elsewhere. We completed about four years of testing vegetation walls, windows, decks, and roofs, but our research is on hold pending the relocation of the fire laboratory. Selected Publications Shelly, J. Utilization options for woody biomass. Vol x, I-Zone Series. Univ Cal For Prod Lab. Monitoring of resin curing in a laboratory press using acousto-ultrasonics. Chen, L and F. Monitoring bond strength development in particleboard during pressing using acousto-ultrasonics. The Encyclopedia of Materials: Mitigation of fire damage in the urban-wildland interface. Overview of the use of ultrasonic technologies in research on wood properties. J Wood Sci and Technol 36 3: Acoustic emission and acousto-ultrasonics. In Nondestructive Testing of Wood Eds: Hardwood drying control using acoustic emission. The Key to Profitable Manufacturing. Monitoring creep rupture in oriented strandboard using acoustic emission: Proceedings, 13th International Symposium Contact details.

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6: Frank BEALL | Our Environment at Berkeley

This paper reviews bond strength research efforts presented by university and industry experts at the Second Annual Symposium for Nondestructive Evaluation of Bond Strength organized by the NDE Sciences Branch at NASA Langley in November

The conference provides an opportunity for students to present their research to faculty and students from the participating universities and to discuss their research with interested individuals. Thirty-five individuals participated in the symposium. This proceedings includes manuscripts of several of the presentations and abstracts of many of the other presentations. Readers who want more information on a topic are encouraged to contact the authors directly. Some of the research has been submitted to journals that publish papers after peer review. The program and a listing of the participants are included. The editor would like to thank all of the authors and presenters for their participation in the symposium, and Florence Sperman for helping to prepare the manuscripts for publication in this proceedings. Papavassiliou, and Vassilios I. Van Rite and Roger G. Dmytryk, and Peter S. Neves, Whitney Prickett, Daniel E. Resasco, and Roger G. Husson, Xianghong Qian, and S. This Proceeding contains papers based on most of the oral presentations. The first symposium was first held in . It has been held annually since then except for a one year break. The following institutions have hosted the symposium. Burke, Jason Anderson, Patrick C. Gilcrease and Todd J. Menkhaus, and Patrick C. A new perspective based on their primary and tertiary structures - David C. Cantu, Yingfei Chen, and Peter J. Johnson, and Matt J. Husson, Xianghong Qian, S. It is meant for graduate students and occasional undergraduates to become familiar with making oral presentations and presenting posters in front of audiences not completely familiar to them, but on the other hand not so foreign as those at a national meeting. Contents Tangential flow filtration for virus purification - David L. Ford, and Peter J. The original schedule for the meeting is shown with all of the submitted presentations. Unfortunately, because of an auto accident, the students from Colorado State University were not able to arrive and make their presentations. The actual program included 13 oral presentations and 9 posters. Some of the CSU manuscripts are included in the proceedings. Pepper, and Charles E. Martyn, Yongqiang Tan, Daniel E. Wood, and Kenneth F. This symposium series was started in by Professors Larry E. Reilly, now of Iowa State University. I first attended this symposium in , and have continued to participate over the years, first as graduate student at Colorado State University, and now as a faculty member at the South Dakota School of Mines and Technology. I have found it to be an ideal forum for graduate students researching the various areas of biochemical engineering, as it provides a peer audience outside the home institution that is less intimidating than those at a national professional meeting. It also provides valuable networking opportunities both during the meeting and at the social picnic, which took place at scenic Mount Rushmore National Monument this year. The objectives of the symposium are to provide an opportunity for students to present and publish their work, and provide a forum for informal discussion of biochemical engineering research being conducted at the participating universities. Twelve of the papers presented at the symposium are included in these proceedings. Because final publication usually takes place in refereed journals, these papers are typically less detailed and often represent works in progress. Contents Automated docking to explore processivities of Family 6 cellobiohydrolases and endoglucanases - Blake Mertz, Anthony D. Hill, Chandrika Mulakala, and Peter J. Reilly, Iowa State University Use of meta-proteomics as a tool to detect stress-related changes in microbial communities - C. Reardon, Colorado State University The mechanism of processive enzymes: Mall em, David J. Dixon, and Patrick C. Green and Patrick C. Gilcrease, South Dakota School of Mines and Technology Field demonstration of bioremediation for a tetrachloroethylene contaminated site - S. Erickson, Kansas State University Pore size distribution of ultrafiltration membranes: The objectives of the symposium were to provide 1 an opportunity for students to present and publish their work, and 2 a forum for informal discussion of bioengineering research being carried out at the participating universities. Fifteen papers presented at the

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symposium are included in these proceedings. Because final publication usually takes place in refereed journals, the articles here are typically brief and often cover work in progress. Erickson, Kansas State University Microcosm investigation of the dechlorination of tetrachloroethene - J. Erickson, Kansas State University Effect of blending with polycaprolactone on the anti-bacterial properties of chitosan for periodontal tissue engineering - Aparna Sarasam, John Dmytryk, Sharukh Khajotia, and Sundararajan Madihally, Oklahoma State University Flow perfusion improves seeding efficiency and spatial distribution in scaffolds for bone tissue engineering - Jose Alvarez-Barreto, R. Reilly, then of the University of Nebraska-Lincoln. It is designed for graduate students and occasionally undergraduates and postdoctoral fellows to present the results of their research and directions of their future work to audiences not so familiar as those at their home institutions but not so seemingly intimidating as those at national professional meetings. To that end, discussions both during the meeting. It should be noted that the 32nd Symposium was held on October 5, There was no symposium in Fourteen papers were delivered orally at the symposium and there were a number of posters. These Proceedings present articles from nearly all the oral presentations and from several posters. Pfromm, and Mary E. Dowd, and Peter J. Walker, and Larry E. Padhye, George Gogos, and Hendrik J. Aikens, and Peter J. Oliver, and Jacqueline V. It is designed for graduate students and occasionally postdoctoral fellows and undergraduates to present the results of their research and directions of their future work to audiences not so familiar as those at their home institutions but not so seemingly intimidating as those at national professional meetings. To that end, discussions both during the meeting and at social events are encouraged. Gehrke, Kansas State University Encapsulation, stabilization, and release of proteins from biodegradable polyanhydrides - Amy S. Lippert and Sookie S. Insight into the catalytic mechanism - Christopher L. Aikens, Alain Laederach, and Peter J. Roth and Sookie S. Shanks, Iowa State University Modification of environmental variables to understand transformation of xenobiotics on root surface: Impact of altering variables on phytotransformation processes - Sigifredo Castro, Lawrence C. Davis, and Larry E. Bruce Fulton, Mark E. Spalding, and Jacqueline V. The program included 10 oral presentations and 3 posters; however the paper by Boyack and Gilcrease was not presented because the presenter was ill and unable to come. Some of the papers describe work that is in progress while others describe completed projects. Many of the authors intend to submit their work for publication elsewhere in a more complete form. A listing of those who attended is given below. The activities began on Friday evening with an indoor picnic because of rain and wind. The Role of Insulin - R. Williams and M U. Hill, Alain Laederach, and Peter J. Hagan, and Stevin H. The symposium is devoted to presentations by students about their ongoing research. The program consisted of 10 oral presentations and 12 poster presentations. Because final publication of these works usually takes place elsewhere, the papers included in these proceedings are brief, and often cover works in progress. Pletneva, and Nenad M. Effect of Glucocorticoid Receptor - Mangalampalli V. James, and Dhinakar S. Lit en, and C. Pferdeort and Kenneth F. Pitzer, Sigifredo Castro-Diaz, and L.

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7: ASTM International - Symposia Papers & STPs

Ultrasonics, microwaves, optically stimulated electron emission (OSEE), and computational chemistry approaches have shown relevance to bond strength Skip to main content Search the history of over billion web pages on the Internet.

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